

THE USE OF VIRTUAL PATIENTS TO TEACH MEDICAL STUDENTS COMMUNICATION SKILLS.

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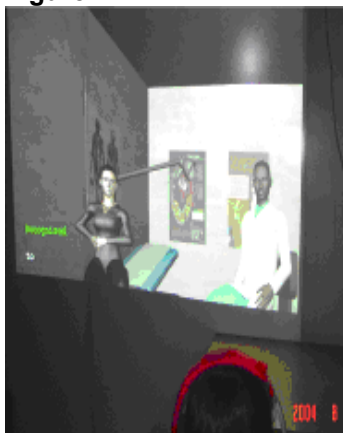
ABSTRACT (75 WORD LIMIT): We report our preliminary results to create a high fidelity, life-size virtual patient (VP) with abdominal pain to teach medical students history-taking and communication skills. The overall rating of the virtual interaction was 6.47 ± 1.63 (1= lowest, 10 = highest) with a trend towards improved ratings with system enhancements. VP's could provide a cost-effective, safe learning environment with the opportunity for extensive repetitive practice with feedback without consequence to real patients.

Background: Effective communication between practitioners and patients improves health care outcomes. At most institutions, medical students learn communication skills through the use of standardized patients (SP's), but SP's are time and resource expensive. Virtual patients (VP's) may offer several advantages over SP's, but little data exist regarding the use of VP's in teaching communication skills.

Objective: To develop an interactive virtual clinical scenario, using a life-sized VP with abdominal pain as the prototype and subsequently to compare medical student behaviors and qualitative responses in their interactions with VP's and SP's.

Methods: Through an interdisciplinary collaboration, we have created an interactive virtual clinical scenario of a patient with acute abdominal pain. In the virtual scenario, a life-sized VP is projected on the wall of an exam room in a SP center (Figure 1, video located at [vr2005.avi](#)).

Figure 1



Before the virtual encounter, the student reviews patient information on a hand-held tablet personal computer and directions include taking a history and developing a differential diagnosis. The virtual system includes two networked personal computers (PC's), one data projector, two USB2 web cameras to track the users head and hand movement, tablet PC, and a microphone. A commercially available speech recognition engine (Dragon Naturally Speaking Professional) was used to process the audio into phrases. The technology used in the study is readily available "off the shelf", and the entire prototype system cost less than \$7,000

The VP is programmed with specific answers and gestures to questions asked by students. Queries to responses were developed by faculty and enhanced by reviewing videotapes of students' performances with real SP's. Students also receive immediate feedback, from a virtual instructor, regarding questions they omitted (i.e. failure to ask a sexual history, etc.).

Results: Study participants included faculty, second, third and fourth year medical students (N=20). All participants had prior experience with real SP's. Immediately after the virtual scenario, participants completed a validated questionnaire (Maastricht Simulated Patient Assessment, Table 1).

Table 1

Survey Statement (N=20)	Response*
The VP appears authentic.	3.95±0.76
VP stimulates the student to ask questions.	3.70±1.08
The virtual scenario is a worthwhile educational experience.	4.25±0.79
I would use this tool to practice my clinical skills.	4.15±0.85
The virtual patient is challenging to the student.	3.8±0.74

*5-point Likert-type scale (1=Strongly Disagree, 5=Strongly Agree)

The global rating of the virtual experience was 6.47 ± 1.63 (1= lowest, 10 = highest) comparing favorably with a 7.4 ± 1.16 rating for real SP's in a previously published study. During the initial experience, the VP correctly recognized more than 60% of the participant's questions and most incorrect voice recognition was not due to technological limitations but could be enhanced by improving the script depth and variability of the VP responses. Later study participants rated the experience much higher and there was improved VP voice recognition due to ongoing script enhancement. Comments from students included that real patients do not always understand what you are saying so that repeating question or rewording the question was not unlike real life.

Conclusions: Preliminary feedback regarding the virtual interaction was positive and suggestions for improvements, including analysis of eye contact, are being incorporated into future versions of the virtual scenario. Other work will also focus on direct comparison of VP's to SP's and integrating the virtual patient into the curriculum. Despite current technological limitations, virtual clinical scenarios could provide a controllable, secure, and safe learning environment with the opportunity for extensive repetitive practice with feedback without consequence to a real or SP. As the technology matures, VP's could augment SP's and produce a cost-savings in fixed model, high stakes clinical skills examinations (i.e. NBME Step 2 Clinical Skills Examination).